In the United States Patent and Trademark Office

Serial No. _____

Appn. Filed : _____

Applicants: Shmuel Erez and Ehood Geva

Appn. Title: DEVICE AND METHOD FOR FASTENER-FREE CONNECTION VIA A HEAT-SHRINKABLE INSERT

Examiner/GAU: _____

Mailed: April 21/04

At: Palo Alto

Information Disclosure Statement

Commissioner for Patents

P.O. Box 1450, Alexandria, VA 22313-1450

Sir:

U.S. Patent 5,549,155 issued to G. Meyer, IV in 1996 discloses a device that has a heat conductive pad held in contact with the top surface of the chip. The pad is attached to a heat-removing pipe to move the heat away from the chip. One surface of the pad is flat and contacts the circuit chip while the opposite surface of the pad contains a cylindrical groove within which the aforementioned pipe is inserted. The pad includes extensions projecting from its sides, and the extensions are used as surfaces upon which pressure is exerted to hold the pad against the chip.

The heat conductive pad is held against the chip at a predetermined pressure by a flexible holding fixture.The device of the aforementioned patent has a complicated structure that consists of many parts and occupies a large space. Furthermore, it requires the use of mechanical fasteners, which requires

additional labor. Another problem is that traces in a printed circuit board are arranged with a very high density and routing them around the mounting hole for the screws is complicated and very undesirable.

US Patent No. 6,075,699 issued in 2000 to W. Rife discloses a heat sink assembly with a retaining clip that has a central member and a number of legs which depending downwardly from the central member with ends of the legs not connected to the central member being free ends. Retention members are provided on each of the free ends of the legs to prevent the legs from being removed from their respective mounting holes. A heat dissipating member, having a threaded base portion is threadably received in a bore in the central member so that the flat bottom surface of the heat dissipating member is in flush thermal communication with the electronic component while the legs are secured within their respective holes in the electronic component. This device is also complicated in structure and occupies an extra space. If an extra pressure is accidentally applied to the chip through the threaded heart sink, this can easily damage the chip.

US Patent No. 6,201,697 issued in 2001 to K. McCullough describes a heat sink assembly, having a number of mounting holes and installed on a heat generating surface of an electronic component for removing heat therefrom. A heat-dissipating member having a base portion having a bottom surface and an upper surface with heat dissipating elements connected thereto is provided. Tight heat transfer connection is provided due to the use of a cam assembly. The cam assembly includes a support body as well as a connection body that is pivotally connected thereto about a pivot axis. The connection body is rotated about the pivot axis to provide a camming action against the top surface of the base portion of the heat dissipating member to maintain the heat dissipating member in flush thermal communication with the heat generating surface of the electronic

component. The device of this patent is complicated and contains a number of moveable mechanical elements. The load applied to the chip by the cam is not controlled and may damage a delicate chip.

U.S. Patent No. 6,695,042 issued in 2004 to B. Boudreaux, et al. describes a heat sink that includes at least one thermally conductive pedestal, allowing configuration of the heat sink to maintain contact with a heat-generating electronic device or a plurality of devices where the devices may not be co-planar due to tolerance stack-up. The pedestals may be raised and lowered and tilted as needed to match the heights and tilts of the electronic devices. Within the heat sink is a cavity above the pedestal that may be filled with a thermally conductive material, such as solder, or a thermally conductive liquid, during construction to create a low thermal resistance contact between the pedestal and the heat sink fins. Also, thermally conductive material, such as thermal paste or a thermal pad, may be used between the heat generating device and the pedestal to create a low thermal resistance contact. A disadvantage of this device is that it requires the use of parts having special geometry and the use of a plurality of mechanically and individually adjustable pedestals. Installation of such a device is time consuming and requires an additional labor for assembling. Furthermore, a provision of two thermal contact interfaces in each of the devices reduces thermal efficiency.

U.S. Patent No. 6,683,796 describes an enclosure with springable tabs for grounding the heatsink in order to suppress EMI that may be caused by propagation of electromagnetic radiation from an electronic device through the heatsink as through an antenna. U.S. Patent No. 6,583,987 describes a grounded metallic shield that surrounds the source of EMI and requires an additional space and adds to complexity of assembling.

U.S. Patent No. 5,988,689 issued in 1999 to E. Lever describes the use of an electroconductive polymeric composition suitable for the purposes of the present invention. This composition is comprised of an organic polymer and a particulate conductive filler.

Thus, none of the references mentioned above discloses, as claimed in our main Claim 1 with dependent Claims 2-18, a fastener-free connection between parts via a heat-shrinkable insert sandwiched between the parts and attached to them, e.g., by glue, so that if an object is placed between the parts, shrinkage of the insert will provide tight heat-transfer contact between the object and one of the parts, e.g., between an electronic chip and a heat sink. Furthermore, none of the aforementioned references discloses, as claimed in our main Claim 19 with dependent Claims 20-23, a method for fastener-free connection of parts by placing a heat-shrinkable insert between these parts for moving the parts towards each other due to shrinking of the insert caused by heating so that an object, such as an electronic chip, could be tightly pressed between the parts, one of which can be made in the form of a heat sink. None of the aforementioned references describes the use of a conductive heat-shrinkable spacer that fulfills two functions: provision of tight heat-transfer contact for transfer of heat from a heat source to the heatsink and grounding of the heat sink for suppression of EMI.

Respectfully,
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Apr 21/04

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

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Complete if Known	
Application Number	
Filing Date	
First Named Inventor	Shmuel Erez
Art Unit	
Examiner Name	
Attorney Docket Number	

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 5,549,155	1996	G. Meyer	
		US-			
		US- 6,075,699	2000	W. Rfe	
		US-			
		US- 6,201,697	2001	K. McCullough	
		US-			
		US- 6,695,042	2004	B. Boudreaux et al.	
		US-			
		US- 6,683,796	2004	S. Radu, et al.	
		US-			
		US- 6,583,987	2003	H. Skinner et al.	
		US-			
		US- 5,988,689	1999	E. Lever	
		US-			
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

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Sheet | | of |

Complete if Known	
Application Number	
Filing Date	
First Named Inventor	
Art Unit	
Examiner Name	
Attorney Docket Number	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		Holland Shielding Systems BV, Netherlands "Conductive Metallization/coating" (Advertisement)	

Examiner Signature		Date Considered	

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